

2018 Community IPM Proposal Implementation Project- October 01, 2018 through February 28, 2019

Title: **Development of Plant Disease Exercises for County Master Gardener Coordinators and Volunteers and other Green Industry Members.**

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Abstract:

The Cornell Plant Disease Diagnostic Clinic staff is proposing to create a hands-on training tool and a train the trainer program. The tool kits (2) will contain everything needed a county educator to perform a continued educational activity with county staff and volunteers, those that interact with the public on a regular basis. The goal is to use common diseases in the environment, set-up a microscopic view with images of structures and explanations of disease cycles. Subject matter experts will ensure materials are accurate and that focus on important IPM priorities and concepts are included.

Background and Justification:

Over the twenty year period of working in the Plant Disease Diagnostic Clinic, I have provided numerous educational opportunities for Extension Educators, Master Gardeners and other Green Industry members. Consistently, the venue and meeting type require my trainings use a Powerpoint presentation format. On rare occasions, my staff and I have created hands-on activities that allow the participants to see cultures of pathogens, to view pathogens microscopically and to use diagnostic kits. These hands-on activities are by far the most highly rated by participants.

For three (3) years from 1999-2001, I proposed and received funding from the Community IPM program to conduct lectures and hands-on training at regional locations around the state. Working with IPM staff, we conducted trainings at various locations for over 1,250 participants. For the past two years, a group of Master Gardeners from four surrounding counties came to the Ithaca campus to participate in a brief, hands-on training and tour of the diagnostic facility. The participants rated the experience as very helpful and their knowledge and understanding was improved.

Because of the success of the previous hands-on training and feedback over the years, we are pleased to work on this project and create kits that would be used by county educators to train their staff and volunteers. Ideally the exercise kits would be used by county educators to conduct plant disease exercises in a continued education format of Master Gardeners or for use at their educational events for county staff, 4H children, elementary or high school students, and landscapers and nursery/greenhouse retail sales staff.

The project is good fit for the Community IPM program because it meets the IPM priorities of “Develop innovative educational materials for Community IPM, to be delivered in multiple media (video, interactive online, etc.) and different languages” and “Demonstrating a link between IPM

practices and reduced risk to human health, or reduced presence of pesticide residues in the environment”.

Objectives:

1. Provide CCE staff and Master Gardener Coordinators with tools to continue educating Master Gardener Volunteers after their initial, orientation training is completed.
2. Use common plant diseases that will be readily available for use to demonstrate the diagnostic process in a hands-on type of learning environment.
3. Supply complete instructions to perform the exercise, so the instructor can walk through the exercise with their trainees confidently.
4. Improve disease diagnostic skills of Cooperative Extension Educators, Master Gardener coordinators and their volunteer workforce.
5. County staff will provide more accurate diagnoses and management recommendations reducing pesticide applications.

Procedures:

1. **Develop a format for the exercise materials.** A format will be designed to include important information for the exercise such as an introduction that can be shared with participants about the purpose of the exercise, an overview of the plant disease and pathogen, a listing of needed materials supplied by the instructor, a listing of materials included in the kit, and complete and detailed descriptions of the images provided in the kit.
2. **Select two plant diseases** that will be readily available for use by the instructor and pathogens that will produce the structures needed to perform the exercise. To ensure a successful exercise, we need to make sure the live material collected by the instructor has a very good chance of containing the structures we describe in the kit materials. We need to select diseases that will help us be successful.
3. **Print materials and arrange kits.** Ensure we include a complete picture of the disease and supplies needed for the exercise. For example, if pictures of various life cycle stages would be helpful because we can't be sure when the exercise will be conducted, then we need to include images of all life stages for comparison with the living tissue used during the exercise.
4. **Schedule and perform training** for five (5) extension educators. Bring the educators to campus or conduct a webinar to conduct the exercises for them. Materials will be provided or mailed to them so they can perform the exercises for their volunteers or other green industry members. Ensure Community IPM goals are clear in the instructions of the exercise and that the educators understand how to convey the IPM goals.
5. **Develop a formal evaluation plan and materials.** The county educators will be surveyed about their train the trainer event to gauge how much they learned. Also an evaluation of the kit (ease of use, missing parts, etc) will be conducted with requested suggestions for improvements. An evaluation will also be created for use with the county participants to understand what they knew pre-training and what they understood post-training.

Results and Discussion:

The overall goal for this project was to elevate the plant disease level of knowledge through practice and exercise of county extension educators and volunteers and their clientele. The expected

outcome of this project is improved disease diagnostic skills for Cooperative Extension Educators, Master Gardeners and community and industry members. Improve diagnostic skills will enable these individuals to make better decisions about the proper course of action to combat a pest problem. Trained individuals make better decisions, convey IPM principles, and pass on the importance of identifying the cause of the problem and the harm of applying a pesticide to an unknown plant problem just to be safe.

The following products were created and outlined here to show the structure of the train-the-trainer material. Two diseases were identified as good candidates to use as examples of a current (and a potentially on-going) problem for NYS growers and residents and that can be easily confused with other key disease or disorders on potato and boxwood plants. The disease that meet these requirements were the late blight pathogen, *Phytophthora infestans*, and the boxwood blight pathogen, *Calonectria pseudonaviculata*.

The training materials created provide a training organizer slide show, organizer set-up instructions to include listings of supplies needed to perform the hands on activity and specifics of how to prepare plant material, and items for the workshop to include a scripted slide show with an overview of the target pathogen, look-alikes and key points for optimum identification and microscopic views of their structures. The workshop materials also contain a pre-test and post-test for evaluation of the activity. The following outline provides all the materials provided and a timeline for steps of the preparation process and delivery of the workshop.

OUTLINE-Late blight and boxwood blight exercises

Prerequisite: Trainees have microscope experience. If not, provide prior to this workshop.

I. Weeks before the workshop:

1. Review the PowerPoint (PP) presentation that includes:
 - a. An introduction regarding the importance of the pathogen/disease
 - b. Reference list for additional background history, management options, etc.
 - c. Section on identification of that organism
 - i. Includes color photos of various symptoms, spores, etc.
 - ii. Includes instructions to prepare sample for examination
 - d. Lists of equipment and supplies needed for the exercise (printout in kit too)
 - e. Section on “Mistaken Identities”, other organisms/issues that may cause similar symptoms
2. Confirm adequate equipment is available; set up equipment prior to the exercise
3. Gather/ collect tools and supplies on list or supplies

II. Days before workshop:

4. Collect “suspect” tissue samples, and set up incubation of plant materials
 - a. 2-3 days for late blight workshop, 3-4 days for boxwood blight workshop
5. Keep some tissue in reserve for the class and/or confirm that class members will bring samples for class use.
6. Print out handouts for trainees
 - a. Reference lists
 - b. Pest photo ID
 - c. Sample handling instructions
 - d. Pre-class evaluation

- e. Post-class evaluation

III. Day of the workshop:

7. Welcome participants, Day of exercise:
 - a. Set out reserved tissue to warm to room temperature if it has been refrigerated.
 - b. Administer pre-workshop evaluation
 - c. Present the PP presentation module
 - d. Lead class exercise.
 - i. Participants examine tissue samples for symptoms (~10 minutes)
 - ii. Participants use tissue to prepare a moist chamber (~10 minutes)
 - iii. Participants make slides from tissue in pre-made moist chamber (~30 minutes)
 - iv. Participants share slides of fungal spores or structures with class (~15 minutes)
 - e. Administer post-workshop evaluation

Project Location:

Objectives 1, 2, 3, and part of 5 were completed but due to time restraints, we were unable to complete objective 4 and the evaluation of that objective which was bringing in a small group to review the materials. In place of this objective, the creative team plans to request a webinar slot with the horticulture listserv members to announce and review this new educational activity.

This demonstration/education project includes an electronic format with associated kit materials. The electronic products include Powerpoint presentations for the trainer for conducting a class to participants and links to the kits materials for those that want to print their own. Physical kit materials will also be available from Sandra Jensen via email at slj2@cornell.edu. The electronic materials are housed on the Plant Disease diagnostic Clinic website at <http://plantclinic.cornell.edu>.

A communication will be sent out through extension listservs to announce the availability, content and method for obtaining the materials will be provided when all materials are posted and the training webinar for the trainers is scheduled.

Samples of resources developed:

Provided in kit for trainer

- Location of materials on website
- Print out of the PP presentation
- 1 Laminated set of the pest photo ID sheets-close up and microscopic views
- 1 Laminated sample collection instructions
- 1 Laminated sample handling instruction
- 1 Laminated equipment and supply needs listing
- Powerpoint script and hands-on exercise guide

These activity kits will provide county cooperative extension educators with all the materials needed to conduct a hands-on, plant pathogen identification training.

